

Lucy McFadden

DAA for Concord Academy trip, Nov. 16, 2011

Title: NASA's Dawn mission to asteroid 4 Vesta.

Oral Presentation: Presented to High School Physics students

Abstract:

NASA's Dawn Mission to asteroid 4 Vesta is part of a 13-year robotic space project designed to reveal the nature of two of the largest asteroids in the Main Asteroid Belt of our Solar System. Ceres and Vesta are two complementary terrestrial protoplanets whose accretion was probably terminated by the formation of Jupiter. They provide a bridge in our understanding between the rocky bodies of the inner solar system and the icy bodies of the outer solar system. Ceres appears to be undifferentiated while Vesta has experienced significant heating and likely differentiation. Both formed very early in the history of the solar system and while suffering many impacts have remained intact, thereby retaining a record of events and processes from the time of planet formation. Detailed study of the geophysics and geochemistry of these two bodies provides critical benchmarks for early solar system conditions and processes that shaped its subsequent evolution. Dawn provides the missing context for both primitive and evolved meteoritic data, thus playing a central role in understanding terrestrial planet formation and the evolution of the asteroid belt. Dawn is to be launched in May 2006 arriving at Vesta in 2010 and Ceres in 2014, stopping at each to make 11 months of orbital measurements. The spacecraft uses solar electric propulsion, both in cruise and in orbit, to make most efficient use of its xenon propellant. The spacecraft carries a framing camera, visible and infrared mapping spectrometer, gamma ray/neutron spectrometer, magnetometer, and radio science.

My talk to the entire school and parents and faculty is about an expedition to collect meteorites in Africa.